PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

REC'D 23 MAR 2005
WIPO PCT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION See Form PCT/IPEA/416	
TP102921/JMA		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/FI 2004/050049	22.04.2004	22.04.2003
International Patent Classification (IPC) or national classification and IPC		
C03B 37/018, C03B 8/04, C03C 17/09		
Applicant		
LIEKKI OY et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 2 sheets, as follows:
      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))
      _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
19.11.2004	01.03.2005
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Lars Hennix/MP Telephone No. +46 8 782 25 00

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/FI 2004/050049

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

☐ international search (under Rules 12.3 and 23.1(b))

☐ publication of the international application (under Rule 12.4)

☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1-12 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

pages _____

pages* _____ as originally filed/furnished

pages* 13-14 as amended (together with any statement) under Article 19

pages* _____ received by this Authority on 11.02.2005

pages* _____ received by this Authority on _____

☒ the drawings:

pages 1-3 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/FI 2004/050049

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-11	YES
	Claims		NO
Inventive step (IS)	Claims	1-11	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-11	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Amended claims 1-11 were filed together with a statement under Article 34 on 2005-02-11.

The following documents were cited in the International Search Report:

D1: EP0957511 A1
D2: US6003342 A1
D3: JP4300225 A1

The cited documents represent the general state of the art. The invention defined in claims 1-11 is not disclosed by any of these documents.

The cited prior art does not give any indication that would lead a person skilled in the art to the claimed method for charging particles or to the claimed particle charging device. Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in claims 1-11 is novel and is considered to involve an inventive step. The invention is industrially applicable.

Claims:

1. A method for charging particles (M1) in a flame process, which particles are used for processing of an optical material, in which method at least

- a gaseous reactant (M2) is supplied,
- oxidizing gas (M3) is supplied in the reactant (M2),

characterized in that

- the oxidizing gas (M3) is charged electrically before it is supplied to the reactant (M2),
- the reactant (M2) and the oxidizing gas (M3) form charged particles (M1) immediately when oxidizing gas (M3) is supplied to the reactant (M2).

2. The method according to claim 1, **characterized** in that the oxidizing gas (M3) is charged in a nozzle (3) by means of which gas is conveyed to the space comprising oxidizing material (M2).

3. The method according to claim 1 or 2, **characterized** in that the oxidizing gas (M3) whose flow rate is 80 to 300 m/s is charged by means of a corona charger (4).

4. The method according to any of the preceding claims, **characterized** in that the material to be processed is a fiber preform or another multicomponent oxide construction or a titanium oxide construction.

5. A particle charging device (1) for forming particles (M1) in a flame process, which particles are used at least for processing of an optical material, which charging device comprises at least

- a channel (2) for supplying a gaseous reactant (M2),
- a channel for supplying oxidizing gas (M3),
- a charging member (4, 5),

characterized in that

- the charging member (4, 5) is arranged to charge the oxidizing gas (M3) electrically,

- after the charging member (4, 5) the channel (M3) of the oxidizing gas is connected to a space, to which the channel (2) supplying the reactant is connected, to form electrically charged particles immediately when the oxidizing gas (M3) is supplied to the reactant (M2).

6. The charging device (1) according to claim 5, **characterized** in that the charging member (4, 5) is a corona charger.

7. The charging device (1) according to claim 5 or 6, **characterized** in that the channel of oxidizing gas is connected to the channel (2) of the reactant (M2) at least by means of one nozzle (3) to convey the oxidizing gas to the channel (2) of the reactant (M2).

8. The charging device (1) according to claim 7, **characterized** in that the nozzle (3) is designed to taper in such a manner that the speed of the gas (M3) flowing therethrough is increased.

9. The charging device according to any of the preceding claims 7 to 8, **characterized** in that the nozzle (3) comprises a charging member (4, 5).

10. The charging device (1) according to claim 5 or 6, **characterized** in that the charging device (1) also comprises at least

- a first gas supply channel (7) in which a charging member (5) is arranged to charge the gas, and
- a second gas supply channel (8) that surrounds the first gas supply channel (7).

11. The charging device (1) according to claim 5 or 6, **characterized** in that the charging device (1) also comprises at least

- a first gas supply channel (7) and
- a second gas supply channel (8) that surrounds the first gas supply channel (7), and
- a charging member (5) arranged in the second gas supply channel to charge the gas.